REMARKS

Claims 11-12, 14-17 and 19-20 are currently pending in this application.

The Examiner has rejected claims 11-12, 14-17 and 19-20 under 35 U.S.C. § 103(a) as being unpatentable over Suzuki (Prog. Lipid Res. Vol. 33, No. 4, pp 429-457, 1994) in view of Masuda et al. (FEBS Letters 464, 71-74, 1999).

The Examiner's reasoning is as follows. Suzuki teaches the branched sialo-sugar molecules of I-Active ganglioside wherein terminal sialic acid is linked to penultimate galactose in 2-3 linkage in combination with the sugar chain Gal-GlcNAc (i.e. page 445, last structure in Table 1) shows high binding to influenza A virus, and the sugar chain Gal-GalNAc shows moderate binding to influenza viruses. Masuda et al. teach that human influenza A virus recognizes the Neu5Ac2-6Gal and Neu5Ac2-3Gal linkages. Therefore, he concludes that one skilled in the art would have a reasonable expectation for success in combining the teachings of these references to accomplish a sialo-sugar molecule having both Neu5Ac2-6Gal and Neu5Ac2-3Gal linkages in combination with the sugar chains such as Gal-GlcNAc or Gal-GalNAc.

This rejection is respectfully traversed.

It was already known before the priority date of the present application that influenza A, B viruses specifically recognize and bind to various gangliosides with a sugar chain containing a sialic acid (hereinafter "sialo-sugar molecules").

Nevertheless, it should be noted that all of the sialo-sugar molecules have only one binding site in one molecule. For instance, all of the sialo-sugar molecules disclosed in the Suzuki reference and Masuda et al. reference have only one binding site such as "Neu5Acα2-3Gal-GlcNAc-" in the corresponding molecule.

Only one exception is that disclosed in page 445, last structure at Table 1 in Suzuki reference, wherein the sialo-sugar molecules of I-Active ganglioside has a branched structure. However, please note that two binding sites of "Neu5Acα2-3Gal-3Galβ1-4G1cNAc β1" in this molecule both have the same structure and therefore these binding sites exhibit the same binding reactivity (selectivity) and provide only one binding property with respect to influenza viruses.

On the other hand, the sialo-sugar molecules represented by the formulae I, II and III of the claimed invention have two different binding sites in one molecule. That is, one of the terminal sialic acids is linked to penultimate galactose in 2-3 linkages in combination with the sugar chain

Gal-GlcNac or Gal-GalNAc, and the other terminal sialic acid is linked to penultimate galactose in 2-6 linkages in combination with the sugar chain Gal-GlcNac or Gal-GalNAc.

An important and patentably distinct feature is present in this structure, which is not at all taught or suggested in the prior art. All of the sialo-sugar molecules in the prior art show an anti-influenza virus activity against only limited type of virus because these compounds have only one binding site therein. Therefore, for the current situation where plural types of viruses are spreading at the same time, the effectiveness thereof will be limited.

On the other hand, according to the sialo-sugar molecule of the claimed invention, a high anti-influenza virus activity against various kinds of influenza viruses can be accomplished as shown in the Examples in the specification. Moreover, it enables a response to a variation in the host range due to influenza virus transmission among animal species or a variation in antigenicity due to an influenza virus antibody that a host possesses.

It is believed that the present invention will make a great contribution in coping with the current situation where plural types of viruses are spreading at the same time. It will be useful as a drug or an adsorbent in a virus removal filter or the like capable of preventing infection with a type A influenza virus and a type B influenza virus originating in many animals including humans and thus preventing a flu epidemic. These matters are also referred in the present specification, e.g., the section "BACKGROUND ART".

In support of the foregoing, attached is a Declaration by the first named inventor herein, Yasuo Suzuki, who is also the author or co-author of the two cited references, i.e. Suzuki and Masuda et al. and of a large number of academic papers and publications that relate to a technical field in connection with the present invention, and is Professor at Chubu University, Japan, College of Life and Health Sciences, Dept. of Biomedical Sciences, and Professor at University of Shizuoka, Japan, School of Pharmaceutical Sciences, Dept. of Biochemistry.

As stated in the attached Declaration, the novel molecule of the invention has a unique functional characteristic that those known in the prior art do not possess, i.e. that it includes both HPAI receptor (2-3) and human type receptor (2-6) within the same molecule, binds to all of avian influenza viruses and human influenza A, B viruses, and inhibits an infection of all the viruses.

It should be emphasized that various sialo-sugar molecules are disclosed in the prior art but none have the above feature of the claimed invention or are suggestive thereof.

Stated otherwise, "two different binding sites" is not taught or suggested in the prior art and a person skilled in the art would not be motivated to combine the two references in such a manner to provide "two different binding sites" as claimed, absent the present disclosure.

For the foregoing reasons, it is apparent that the rejections of prior art are untenable and should be withdrawn.

No further issues remaining, allowance of this application is respectfully requested.

If the Examiner has any comments or proposals for expediting prosecution, please contact undersigned at the telephone number below.

Respectfully submitted,

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